



## DOE to Utilize Innovative Cleanup Technologies

The Department of Energy (DOE) and its technical support contractor, MACTEC-ERS, plan to implement two aggressive innovative technologies in the summer of 2002, to address a three to four-acre area contaminated with Non-Aqueous Phase Liquids (NAPLs) at the northeast corner of the STAR Center property. Implementation of this project follows nearly two years of extensive review of potential treatment technologies by the DOE and MACTEC-ERS with various regulatory agencies and private industry.

NAPLs, particularly chlorinated solvents such as Trichloroethene (TCE) and Dichloroethene (DCE), are among the most common of environmental contamination problems in the United States and for most industrialized countries. NAPLs pose long-term groundwater contamination problems due to their limited solubility in groundwater and significant potential for migration. Thousands of sites in the United States are contaminated with NAPLs, often at contamination volumes that are difficult to detect, but in quantities that can represent significant sources of groundwater contamination. If not remediated, NAPLs will continue to slowly dissolve into the groundwater over a period of years prolonging groundwater clean-up efforts. In addition to directly contaminating the groundwater, NAPLs may break down and form other hazardous substances (i.e., vinyl chloride) that can threaten human health, dramatically increase clean-up costs and inhibit land reutilization.

When the NAPLs were discovered at the site where groundwater remediation efforts were already underway, the DOE and MACTEC-ERS immediately initiated an extensive characterization effort to identify the type and extent of NAPL contamination. The resulting studies have defined both the types of NAPL contaminants present and the extent of the contaminant area, called the plume. Upon conclusion of these studies, MACTEC-ERS awarded a contract to SteamTech Environmental Services of Bakersfield, California to perform

NAPL remediation activities at the site. SteamTech and its subcontractors on the project will utilize two innovative technologies — InSitu Thermal Remediation (Steam Injection) and Six-Phase Heating (electrical resistive heating). These technologies were extensively tested recently by the Inter-agency DNAPL Consortium at a NASA remediation site on Cape Canaveral Air Station, Cape Canaveral, Florida.

In-Situ Thermal Remediation by steam injection uses boilers to generate steam which is then pumped into injection wells that have been placed in the ground surrounding the contaminants. Utilized in conjunction with the Six Phase Heating, the steam front converts the contaminants to a vapor allowing them to move more readily through the soil. The steam front continues to push the contaminants toward a central network of extraction wells for removal and prevents movement of the contaminants outside the treatment zone.

The Six-Phase Heating technology removes contaminants from soil and groundwater by passing an electrical current through the soil. The passage of current generates heat due to electrical resistance within the soil. This is the same process used in any electrically heated device (e.g., clothes iron, heater, stove). Generation of heat throughout the soil in the remediation area increases the temperature of the soil to the boiling point of water. Moisture in the soil is transformed into steam that is captured by recovery wells for removal.

Pending final regulatory approvals, plans are to begin field construction of the treatment systems in early June 2002 with actual remedial activities expected to begin approximately 60 days later. To ensure that the selected technologies are successful, initial efforts expected to take approximately eight months will focus on the smaller portion at the northern edge of the plume. If successful, then the use of the selected technologies will be extended to the remainder of the plume. The entire NAPL remediation effort is expected to take three to four years.